

REMARKS/ARGUMENTS

Claim Status

Claims 1, 4, 6-15, and 18-28 are pending. Claims 2, 3, 5, 16, and 17 stand withdrawn. Claims 1, 4, and 6-14 stand rejected under 35 U.S.C. § 102 as being unpatentable over U.S. Patent No. 4,711,266 to Leiber, hereinafter “Leiber.” Claims 15 stands rejected under 35 U.S.C. § 103 as being unpatentable over Leiber. Claims 18, 26, and 28 stand rejected under 35 U.S.C. § 103 as being unpatentable over Leiber in view of U.S. Patent No. 4,664,136 to Everett, hereinafter “Everett.” Claims 19-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Leiber in view of U.S. Patent No. 3,455,472 to Franz, hereinafter “Franz.” Claims 21-25 stand rejected under 35 U.S.C. § 103 as being unpatentable over Leiber in view of U.S. Patent No. 3,022,450 to Chase, Jr., hereinafter “Chase.”

Claims 1, 6, and 25 have been amended. Claim 24 has been canceled. Claim 29 has been newly added. No new matter has been added.

Applicant respectfully traverses the grounds for rejection and requests reconsideration and withdrawal of the rejections of claims 1, 4, 6-15, 18-23, and 25-28 in view of the following.

Rejections Under 35 U.S.C. § 102 and 103

Independent Claims 1 and 6

Independent claims 1 and 6 each include features that are neither disclosed nor suggested by the cited references, either taken alone or in combination, namely as represented by claim 1,

1. (Currently Amended) An electromagnetic actuator comprising:
a housing defining a cavity therein;
a solenoid coil disposed in the cavity of the housing;
an armature disposed substantially coaxially with the solenoid coil, wherein the armature can move between a first position proximate a portion of the housing and a second position distal of the portion of the housing, in the second position the armature and the portion of the housing define a first gap therebetween;
an extension member extending in an axial direction into the first gap and defining a second gap, the width of the second gap being less than the width of the first gap; and
a permanent magnet disposed in the housing, the permanent magnet facing the armature, the permanent magnet and the armature being on opposite sides of the first gap, wherein the permanent magnet biases the armature towards the solenoid. (emphasis added)

Claims 1 and 6 are directed to an electromagnetic actuator having a housing, a solenoid coil, an armature, and a permanent magnet. The armature can move between a first position proximate a portion of the housing and a second position distal of the portion of the housing. In the second position, the armature and the portion of the housing define a first gap. The actuator also includes an extension member extending in an axial direction into the first gap and defines a second gap, the width of the second gap being less than the width of the first gap. The permanent magnet faces the armature, the permanent magnet and the armature being on opposite sides of the first gap. In this manner, the extension member and the orientation of the permanent magnet may combine to provide high initial forces.

Leiber does not disclose or suggest a permanent magnet (conceded by the examiner in the Office Action at page 5, first paragraph). As such, the examiner relies on Chase as disclosing a permanent magnet. In Chase, however, the armature 14 *passes through* the permanent magnet 38. In contrast, claim 1 recites that the permanent magnet *faces* the armature. This facing between the armature and the magnet provides a large surface area for generation of magnetic force field, thereby allowing for a high initial force. Also, the extension member provides a low resistance path for magnet flux, thereby allowing for a high initial force. There is no suggestion or motivation in the cited references to modify the magnet of Chase in the manner as recited by the claims.

Accordingly, applicant submits that the cited references, either taken alone or in combination, do not disclose or suggest the features of independent claims 1 and 6. Additionally, inasmuch as dependent claims 4, 7-15, 18-23, and 25-28 (which have also been rejected over the cited references) are dependent on claims 1 or 6, these claims are patentable over the cited references, at least by virtue of their dependency. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejections of claims 1, 4, 6-15, 18-23, and 25-28 under 35 U.S.C. § 103(a) and 35 U.S.C. § 102(b).

New Claim

Claim 29 has been added to further define the invention. The new claim finds support in the specification as originally filed at least in Figures 1-4.

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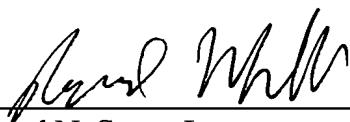
Drawings

Enclosed are 4 sheets of Fornal Drawings consisting of Figures 1, 2, 3, 4, 5, 6.

Conclusion

For all the foregoing reasons, applicant respectfully submits that the present application is now in condition for allowance. Reconsideration of the Office Action and an early Notice of Allowance are respectfully requested. In the event that the examiner cannot allow the present application for any reason, the examiner is encouraged to contact the undersigned attorney, Raymond N. Scott Jr. at (215) 564-8951, to discuss resolution of any remaining issues.

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